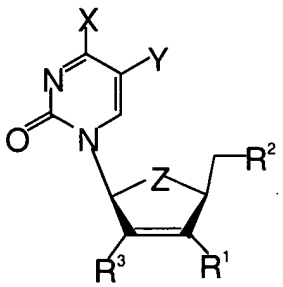
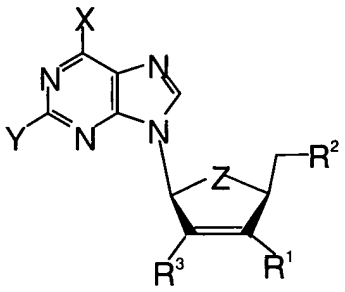
WE CLAIM:

1. A compound of the general formula:



[I]



[II]

or its pharmaceutically acceptable salt or prodrug thereof,

wherein:

X is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

Y is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

R^1 is H, halogen (F, Cl, Br, I), CN, CF_3, N_3, CH_3, CH_2CH_3, $C(N_3)=CH_2$, CH_2OH, $CH=CH_2$, ethynyl, $CONH_2$, $CSNH_2$, COOH, $COOR^4$, or R^4.

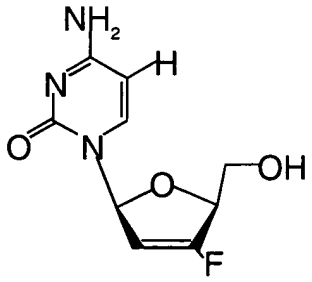
R^2 is OH, OR^4, $OC(O)R^4$, OPO_3H_2, $OP_2O_6H_3$, $OP_3O_9H_4$, OPO_3Na_2, $OPO_3R^4R^5$, $OP_2O_6Na_3$, $OP_2O_6R^4{}_2R^5$, $OP_3O_9Na_4$, $OP_3O_9R^4{}_3R^5$, SH, SR^4, $SC(O)R^4$, NH_2, $NHC(O)R^4$, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, PO_3H_2, $P_2O_6H_3$, $P_3O_9H_4$, PO_3Na_2, $P_2O_6Na_3$, $P_3O_9Na_4$, $PO_3R^4R^5$, $P_2O_6R^4{}_2R^5$, $P_3O_9R^4{}_3R^5$.

R^3 is H.

Z is O, S, CH_2 or $C=CH_2$.

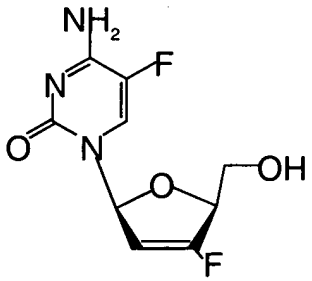
wherein R^4 and R^5 are the same or different and are lower alkane or alkene or acyl of carbon 1-17 or aryl or aralkyl, such as unsubstituted or substituted phenyl or benzyl.

2. The compound of claim 1 of the formula:



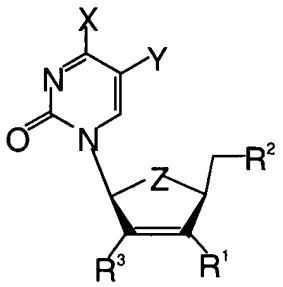
or its pharmaceutically acceptable salt or prodrug thereof.

3. The compound of claim 1 of the formula:



or its pharmaceutically acceptable salt or prodrug thereof.

4. A pharmaceutical composition for the treatment or prophylaxis of a hepatitis B viral infection in a host comprising an effective amount of a compound of the general formula:



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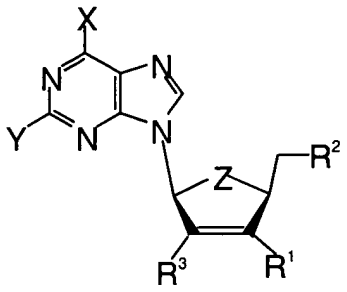


[II]

or its pharmaceutically acceptable salt or prodrug thereof,

wherein:

X is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

Y is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

R^1 is H, halogen (F, Cl, Br, I), CN, CF_3, N_3, CH_3, CH_2CH_3, $C(N_3)=CH_2$, CH_2OH, $CH=CH_2$, ethynyl, $CONH_2$, $CSNH_2$, COOH, $COOR^4$, or R^4.

R^2 is OH, OR^4, $OC(O)R^4$, OPO_3H_2, $OP_2O_6H_3$, $OP_3O_9H_4$, OPO_3Na_2, $OPO_3R^4R^5$, $OP_2O_6Na_3$, $OP_2O_6R^4{}_2R^5$, $OP_3O_9Na_4$, $OP_3O_9R^4{}_3R^5$, SH, SR^4, $SC(O)R^4$, NH_2, $NHC(O)R^4$, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, PO_3H_2, $P_2O_6H_3$, $P_3O_9H_4$, PO_3Na_2, $P_2O_6Na_3$, $P_3O_9Na_4$, $PO_3R^4R^5$, $P_2O_6R^4{}_2R^5$, $P_3O_9R^4{}_3R^5$.

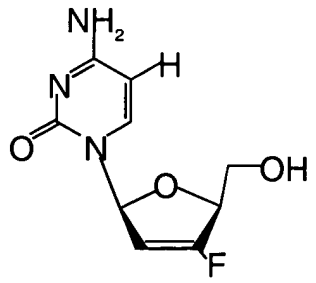
R^3 is H.

Z is O, S, CH_2 or $C=CH_2$.

wherein R^4 and R^5 are the same or different and are lower alkane or alkene or acyl of carbon 1-17 or aryl or aralkyl, such as unsubstituted or substituted phenyl or benzyl;

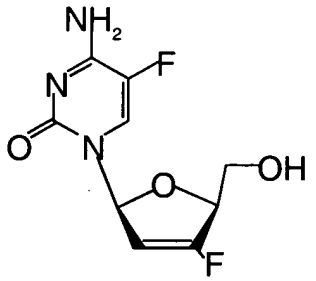
optionally in a pharmaceutically acceptable carrier or diluent.

5. A pharmaceutical composition for the treatment or prophylaxis of a hepatitis B viral infection in a host comprising an effective amount of a compound of the formula:



or its pharmaceutically acceptable salt or prodrug thereof;
optionally in a pharmaceutically acceptable carrier or diluent.

6. A pharmaceutical composition for the treatment or prophylaxis of a hepatitis B viral infection in a host comprising an effective amount of a compound of the formula:



or its pharmaceutically acceptable salt or prodrug thereof;
optionally in a pharmaceutically acceptable carrier or diluent.

7. The pharmaceutical composition of any of claims 4-6, wherein the hepatitis B virus is resistant to one or more other antivirally effective drugs.

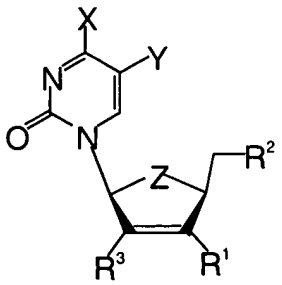
8. The pharmaceutical composition of claim 7, wherein the hepatitis B virus is resistant to 3TC (lamivudine).

9. The pharmaceutical composition of claim 7, wherein the hepatitis B virus is resistant to (-)-FTC.

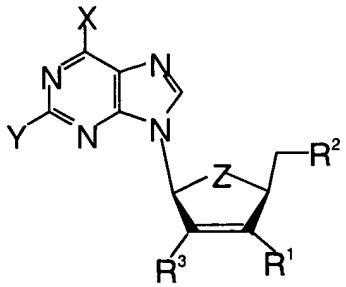
10. The pharmaceutical composition of any of claims 4-9, wherein the composition or its pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

11. The pharmaceutical composition of claim 10, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2'-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine [(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

12. A pharmaceutical composition for the treatment or prophylaxis of an HIV viral infection in a host comprising an effective amount of a compound of the general formula:



[I]



[II]

or its pharmaceutically acceptable salt or prodrug thereof,

wherein:

X is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

Y is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

R^1 is H, halogen (F, Cl, Br, I), CN, CF_3, N_3, CH_3, CH_2CH_3, $C(N_3)=CH_2$, CH_2OH, $CH=CH_2$, ethynyl, $CONH_2$, $CSNH_2$, COOH, $COOR^4$, or R^4.

R^2 is OH, OR^4, $OC(O)R^4$, OPO_3H_2, $OP_2O_6H_3$, $OP_3O_9H_4$, OPO_3Na_2, $OPO_3R^4R^5$, $OP_2O_6Na_3$, $OP_2O_6R^4{}_2R^5$, $OP_3O_9Na_4$, $OP_3O_9R^4{}_3R^5$, SH, SR^4, $SC(O)R^4$, NH_2, $NHC(O)R^4$, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, PO_3H_2, $P_2O_6H_3$, $P_3O_9H_4$, PO_3Na_2, $P_2O_6Na_3$, $P_3O_9Na_4$, $PO_3R^4R^5$, $P_2O_6R^4{}_2R^5$, $P_3O_9R^4{}_3R^5$.

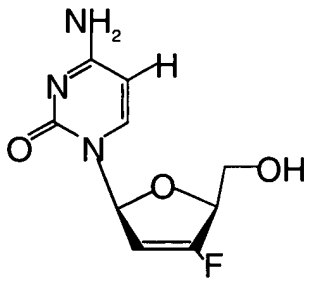
R^3 is H.

Z is O, S, CH_2 or $C=CH_2$.

wherein R^4 and R^5 are the same or different and are lower alkane or alkene or acyl of carbon 1-17 or aryl or aralkyl, such as unsubstituted or substituted phenyl or benzyl;

optionally in a pharmaceutically acceptable carrier or diluent.

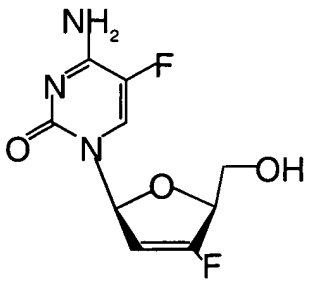
13. A pharmaceutical composition for the treatment or prophylaxis of an HIV viral infection in a host comprising an effective amount of a compound of the formula:



or its pharmaceutically acceptable salt or prodrug thereof;

optionally in a pharmaceutically acceptable carrier or diluent.

14. A pharmaceutical composition for the treatment or prophylaxis of an HIV viral infection in a host comprising an effective amount of a compound of the formula:



or its pharmaceutically acceptable salt or prodrug thereof;

optionally in a pharmaceutically acceptable carrier or diluent.

15. The pharmaceutical composition of any of claims 12-14, wherein the HIV virus is resistant to one or more other antivirally effective drugs.

16. The pharmaceutical composition of claim 15, wherein the HIV virus is resistant to 3TC (lamivudine).

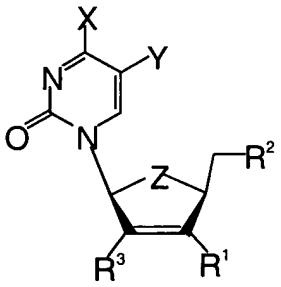
17. The pharmaceutical composition of claim 15, wherein the HIV virus is resistant to (-)-FTC.

18. The pharmaceutical composition of any of claims 12-17, wherein the composition or its pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

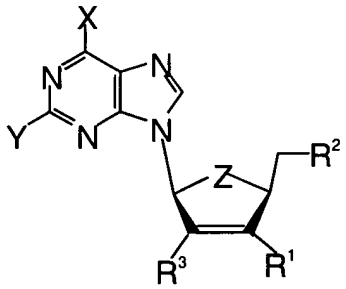
19. The pharmaceutical composition of claim 18, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2'-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine

[(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

20. A method for treating a host infected with hepatitis B virus comprising administering an effective amount of a compound of the general formula:



[I]



[II]

or its pharmaceutically acceptable salt or prodrug thereof,

wherein:

X is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

Y is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

R^1 is H, halogen (F, Cl, Br, I), CN, CF_3, N_3, CH_3, CH_2CH_3, $C(N_3)=CH_2$, CH_2OH, $CH=CH_2$, ethynyl, $CONH_2$, $CSNH_2$, COOH, $COOR^4$, or R^4.

R^2 is OH, OR^4, $OC(O)R^4$, OPO_3H_2, $OP_2O_6H_3$, $OP_3O_9H_4$, OPO_3Na_2, $OPO_3R^4R^5$, $OP_2O_6Na_3$, $OP_2O_6R^4{}_2R^5$, $OP_3O_9Na_4$, $OP_3O_9R^4{}_3R^5$, SH, SR^4, $SC(O)R^4$, NH_2, $NHC(O)R^4$, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, PO_3H_2, $P_2O_6H_3$, $P_3O_9H_4$, PO_3Na_2, $P_2O_6Na_3$, $P_3O_9Na_4$, $PO_3R^4R^5$, $P_2O_6R^4{}_2R^5$, $P_3O_9R^4{}_3R^5$.

R^3 is H.

Z is O, S, CH_2 or $C=CH_2$.

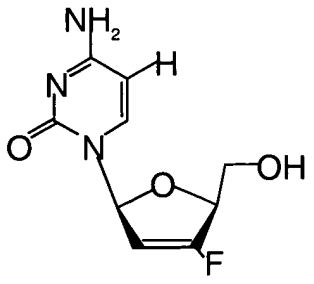
wherein R^4 and R^5 are the same or different and are lower alkane or alkene or acyl of carbon 1-17 or aryl or aralkyl, such as unsubstituted or substituted phenyl or benzyl;

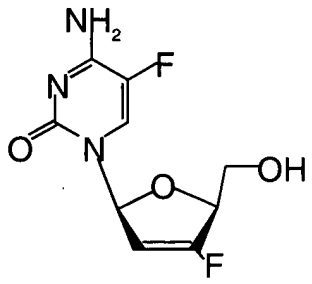
optionally in a pharmaceutically acceptable carrier or diluent.

21. The method of claim 20, wherein the compound or a pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

22. The method of claim 21, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2′-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine [(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

23. The method of claim 22, wherein the compound of formula I or a pharmaceutically acceptable salt or prodrug thereof is selected from the group consisting of:





optionally in a pharmaceutically acceptable carrier or diluent.

24. The method of claim 23, wherein the compound or a pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

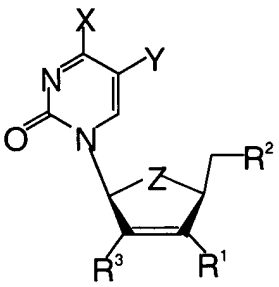
25. The method of claim 24, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2'-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine [(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

26. The method of any of claims 20-25, wherein the hepatitis B virus is resistant to one or more other antivirally effective drugs.

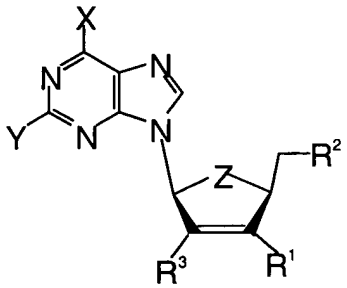
27. The method of claim 26, wherein the hepatitis B virus is resistant to 3TC (lamivudine).

28. The method of claim 26, wherein the hepatitis B virus is resistant to (-)-FTC.

29. A method for treating a host infected with an HIV virus comprising administering an effective amount of a compound of the general formula:



[I]



[II]

or its pharmaceutically acceptable salt or prodrug thereof,

wherein:

X is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

Y is hydrogen, halogen (F, Cl, Br, I), NH_2, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, SH, SR^4, OH, OR^4, N_3, CN, CF_3.

R^1 is H, halogen (F, Cl, Br, I), CN, CF_3, N_3, CH_3, CH_2CH_3, $C(N_3)=CH_2$, CH_2OH, $CH=CH_2$, ethynyl, $CONH_2$, $CSNH_2$, COOH, $COOR^4$, or R^4.

R^2 is OH, OR^4, $OC(O)R^4$, OPO_3H_2, $OP_2O_6H_3$, $OP_3O_9H_4$, OPO_3Na_2, $OPO_3R^4R^5$, $OP_2O_6Na_3$, $OP_2O_6R^4{}_2R^5$, $OP_3O_9Na_4$, $OP_3O_9R^4{}_3R^5$, SH, SR^4, $SC(O)R^4$, NH_2, $NHC(O)R^4$, NHR^4, NR^4R^5, NHOH, $NHOR^4$, $NHNH_2$, NR^4NH_2, $NHNHR^4$, PO_3H_2, $P_2O_6H_3$, $P_3O_9H_4$, PO_3Na_2, $P_2O_6Na_3$, $P_3O_9Na_4$, $PO_3R^4R^5$, $P_2O_6R^4{}_2R^5$, $P_3O_9R^4{}_3R^5$.

R^3 is H.

Z is O, S, CH_2 or $C=CH_2$.

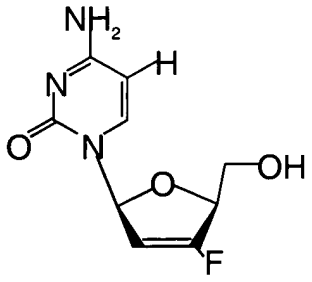
wherein R^4 and R^5 are the same or different and are lower alkane or alkene or acyl of carbon 1-17 or aryl or aralkyl, such as unsubstituted or substituted phenyl or benzyl;

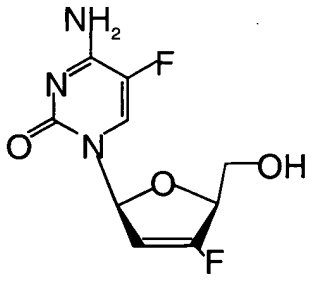
optionally in a pharmaceutically acceptable carrier or diluent.

30. The method of claim 29, wherein the compound or a pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

31. The method of claim 30, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2'-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine [(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

32. The method of claim 29, wherein the compound of formula I or a pharmaceutically acceptable salt or prodrug thereof is selected from the group consisting of:





optionally in a pharmaceutically acceptable carrier or diluent.

33. The method of claim 32, wherein the compound or a pharmaceutically acceptable salt or prodrug thereof is administered in combination or alternation with one or more other antivirally effective agents.

34. The method of claim 33, wherein the other antivirally effective agent is one or more agents selected from the group consisting of acyclovir (ACV), ganciclovir (GCV or DHPG), valyl-ganciclovir, E-5-(2-bromovinyl)-2'-deoxyuridine (BVDU), (E)-5-vinyl-1-β-D-arabonosyluracil (VaraU), (E)-5-(2-bromovinyl)-1-β-D-arabinosyluracil (BV-araU), 1-(2-deoxy-2-fluoro-β-D-arabinosyl)-5-iodocytosine (D-FIAC), 1-(2-deoxy-2-fluoro-β-L-arabinosyl)-5-methyluracil (L-FMAU), (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)adenine [(*S*)-HPMPA], (*S*)-9-(3-hydroxy-2-phosphonylmethoxypropyl)-2,6-diaminopurine [(*S*)-HPMPDAP], (*S*)-1-(3-hydroxy-2-phosphonyl-methoxypropyl)cytosine [(*S*)-HPMPC, or cidofivir], and (2 *S*,4*S*)-1-[2-(hydroxymethyl)-1,3-dioxolan-4-yl]-5-iodouracil (L-5-IoddU), FTC, entecavir, interferon-α, pegelated interferon-α, lamivudine (3TC), LdT, LdC, tenofovir and adefovir.

35. The method of any of claims 29-34, wherein the HIV virus is resistant to one or more other antivirally effective drugs.

36. The method of claim 35, wherein the HIV virus is resistant to 3TC (lamivudine).

37. The method of claim 35, wherein the HIV virus is resistant to (-)-FTC.